PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Christian Georg GERLACH — Attorney Docket Q62288

Appln. No.: Not yet assigned — Group Art Unit: Not yet assigned

Filed: December 29, 2000 — Examiner: Not yet assigned

For: METHOD FOR SIMPLE SIGNAL, TONE AND PHASE CHANGE DETECTION

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 1, after the title insert the heading --**Background of the Invention**--.

first paragraph, please amend as follows:

The Invention relates to a method for detecting an information signal, tone and /or a phase change of a tone in one or more signals which contain inter alia this information signal or this tone.

after line 28 (not including paragraph spacing), insert the heading --**Summary of the Invention**--.

Page 2, paragraph beginning at line 4, delete in its entirety.

Page 2, paragraph beginning at line 7, amend as follows:

This object is achieved in accordance with the invention in a method for detecting an information signal, tone and/or phase change of a tone in one or more signals which contain *inter*

alia this information signal or this tone, wherein the signal in which specific information signals or tones (frequencies) are to be detected is divided into time-consecutive blocks and only a selection of the blocks, which is smaller than the total number of blocks, is examined, and a transformation, for example a frequency transformation (transformation from time domain to the Laplace domain), of the signal is carried out in the examined blocks in order to obtain result values for the decision. In one embodiment, these may then be combined.

Page 7, after line 10, insert the heading --**Brief Description of the Drawings**--.

Page 8, after line 9, insert the heading --**Detailed Description of the Invention**--.

IN THE CLAIMS:

Please enter the following amended claims:

5. (Amended) Method according to claim 1, characterised in that the transformation is frequency-selective and has been or is adjusted to the frequency of the tone currently to be detected.

6. (Amended) Method according to claim 1, characterised in that a Fourier transform is used.

7. (Amended) Method according to claim 1, characterised in that a Fourier transform is used after multiplication of the time signal by a window.

8. (Amended) Method according to claim 6, characterised in that the Fourier transform is computed by using a Goertzel algorithm, this having been or being adjusted to the frequency of the tone to be detected in each case.

9. (Amended) Method according to claim 1, characterised in that the phase relation is detected at a first moment and a moment which is delayed by a defined time

difference (corresponding to a first and a subsequent block) to determine a phase change from complex output values of the transformation, in that the phase difference of the phase relations at the two moments is compared with the phase difference of the phase relations of a third moment which is delayed by the same time difference in comparison with the second moment with respect to the second moment, and in that in the event of sufficiently exact coincidence of the two phase differences the absence of a phase change in the signal is decided on and in the event of a large deviation in the two phase differences the presence of a phase change in the signal is decided on.

11. (Amended) Method according to claim 9, characterised by its implementation by evaluation of the formula

$$\tilde{y}_{v}(N\text{-}1)\,\tilde{y}^{*}_{v+2}(N\text{-}1)\,\tilde{y}^{*}_{v+2}(N\text{-}1)\,\tilde{y}_{v+4}(N\text{-}1) = z$$

12. (Amended) Method according to claim 1, characterised in that the block length (= number of sample values of a block) and/or the number of blocks used for detection is adjusted as a function of the signal/noise ratio (SNR) of the signal in such a way that a substantially constant error rate of detection is achieved over a range of signal/noise ratios.

13. (Amended) Method according to claim 1, characterised in that a plurality of channels are processed in a type of time-division multiplex with offset blocks.

14. (Amended) Device for detecting an information signal, tone and/or a phase change of a tone in one or more signals which contain(s) inter alia this information signal or this tone, characterised in that the device has means for carrying out the method according to claim 1.

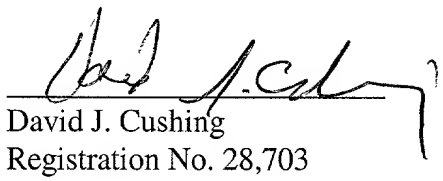
IN THE ABSTRACT:

After the heading, delete the title in its entirety

REMARKS

Entry and consideration of this Amendment are respectfully requested.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 1, first paragraph, please amend as follows:

The Invention relates to a method [according to the preamble of claim 1]for detecting an information signal, tone and /or a phase change of a tone in one or more signals which contain inter alia this information signal or this tone.

Page 2, paragraph beginning at line 4, delete in its entirety.

Page 2, paragraph beginning at line 7, amend as follows:

This object is achieved in accordance with the invention in a method for detecting an information signal, tone and/or phase change of a tone in one or more signals which contain *inter alia* this information signal or this tone, wherein [According to the invention therefore,] the signal in which specific information signals or tones (frequencies) are to be detected is divided into time-consecutive blocks and only a selection of the blocks, which is smaller than the total number of blocks, is examined, and a transformation, for example a frequency transformation (transformation from time domain to the Laplace domain), of the signal is carried out in the examined blocks in order to obtain result values for the decision. In one embodiment, these may then be combined.

IN THE CLAIMS:

The claims are amended as follows:

5. (Amended) Method according to [one of the preceding claims]claim 1, characterised in that the transformation is frequency-selective and has been or is adjusted to the frequency of the tone currently to be detected.

6. (Amended) Method according to [one of the preceding claims]claim 1, characterised in that a Fourier transform is used.

7. (Amended) Method according to [one of the preceding claims]claim 1, characterised in that a Fourier transform is used after multiplication of the time signal by a window.

8. (Amended) Method according to claim 6 [or 7], characterised in that the Fourier transform is computed by using a Goertzel algorithm, this having been or being adjusted to the frequency of the tone to be detected in each case.

9. (Amended) Method according to [one of the preceding claims]claim 1, characterised in that the phase relation is detected at a first moment and a moment which is delayed by a defined time difference (corresponding to a first and a subsequent block) to determine a phase change from complex output values of the transformation, in that the phase difference of the phase relations at the two moments is compared with the phase difference of the phase relations of a third moment which is delayed by the same time difference in comparison with the second moment with respect to the second moment, and in that in the event of sufficiently exact coincidence of the two phase differences the absence of a phase change in the signal is decided on and in the event of a large deviation in the two phase differences the presence of a phase change in the signal is decided on.

11. (Amended) Method according to claim 9 [or 10], characterised by its implementation by evaluation of the formula

$$\tilde{y}_{v}(N\text{-}1)\,\tilde{y}^{*}_{v+2}(N\text{-}1)\,\tilde{y}^{*}_{v+2}(N\text{-}1)\,\tilde{y}_{v+4}(N\text{-}1) = z$$

12. (Amended) Method according to [one of the preceding claims]claim 1, characterised in that the block length (= number of sample values of a block) and/or the number of blocks used for detection is adjusted as a function of the signal/noise ratio (SNR) of the signal in such a way that a substantially constant error rate of detection is achieved over a range of signal/noise ratios.

13. (Amended) Method according to [one of the preceding claims]claim 1, characterised in that a plurality of channels are processed in a type of time-division multiplex with offset blocks.

14. (Amended) Device for detecting an information signal, tone and/or a phase change of a tone in one or more signals which contain(s) inter alia this information signal or this tone, characterised in that the device has means for carrying out the method according to [one of the preceding claims] claim 1.